

Institute of Paper Science and Technology
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**CONTINUOUS EVALUATION OF
CORRUGATING MEDIUM**

Project 1108-17

Progress Report 55

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

December 1, 1959

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

PURPOSE OF THIS STUDY

The purpose of this study is to provide a continuous evaluation of the quality and runability of corrugating medium produced by members of the Fourdrinier Kraft Board Institute. The study, as it progresses, is accumulating a backlog of data and experience which provides several important benefits. For example, it enables each participant to evaluate his position in relation to the rest of the industry. In addition, it provides background information essential for the judicious interpretation of any proposed specifications on corrugating medium (on either a company or industry basis). The program also provides a basis for comparing Concora results obtained at the Institute with those obtained at the mills on corresponding rolls of medium. This comparison is a helpful adjunct to conventional calibration procedures.

PROCEDURE FOR PARTICIPATING

The procedure for participating in this study involves the submission of two rolls of corrugating medium per week from each machine to The Institute of Paper Chemistry. These rolls are taken from regular production runs on different days. Each roll is 10 to 12 inches wide and contains approximately 5,000 lineal feet of medium (approximately 30 inches in diameter). When received by the Institute, each roll is assigned a code letter and number. The rolls are numbered in the sequence in which they are received. Code letters are assigned on the basis of machines, and a given machine is assigned a

different code letter each month in order to mask the identity of the mills. For purposes of reference, an outline of this program which describes the necessary instructions for sampling was appended to Progress Report One in this series.

PRESENTATION AND DISCUSSION OF TEST RESULTS OBTAINED AT
THE INSTITUTE OF PAPER CHEMISTRY

During the month of November, one hundred and four rolls of corrugating medium were selected from the production of nineteen machines and submitted to The Institute of Paper Chemistry for evaluation. A tabulation of the number of rolls submitted from each machine is given in Table I.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), Concora flat crush (tested immediately after fluting), H. and D. flat crush (single-faced board), and runability. Concora flat crush results obtained on specimens tested immediately after fluting were included for the first time in Progress Report 45. Runability was measured by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension. If unsatisfactory runability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runability was obtained (no ruptured flutes). If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

Flat crush was determined on the board obtained at a speed of 600 f.p.m. with minimum tension. In addition to information about quality, these

TABLE I
NUMBER OF ROLLS OF CORRUGATING MEDIUM SUBMITTED
FOR EVALUATION FROM EACH MACHINE

Machine Code	Number of Rolls
A	9
B	9
C	4
D	10
E	7
F	12
G	10
H	6
I	7
J	3
K	1
L	6
M	1
N	1
O	6
P	4
Q	2
R	4
S	2
Total	104

results will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

As requested by members of the F.K.B.I., the Concora medium test results are calculated on the basis of pounds of load per unit area rather than on the basis of the formula suggested by the Concora manufacturer and are reported as Concora flat crush test results. In Progress Reports One and Two, the Concora medium test results were reported on the basis of the formula suggested by the Concora manufacturer.

The average test results obtained on the rolls of corrugating medium submitted by each participant (current machine averages) are shown in Table II and graphically presented in Figures 1 to 5. In addition to a comparison of the test data obtained for the various machines, Table II also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average is the average of test results for all machines participating in the study during the current month. The cumulative F.K.I. average is based on the results for the previous twelve-month period excluding the result for the current period. The F.K.I. index is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

TABLE II
SUMMARY OF CURRENT MACHINE AVERAGES
November, 1959

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i. (Conditioned)	Concora Flat Crush, p.s.i. (Tested Immediately)	Single-Face Flat Crush, p.s.i.
A	29.2	10.6	37.4	46.6	31.3
B	26.8	11.2	34.2	43.4	30.9
C	26.7	8.7	35.3	41.8	29.2
D	26.7	10.8	34.9	45.3	32.0
E	27.7	10.1	39.2	48.5	36.5
F	26.8	10.9	35.5	45.9	31.9
G	27.7	10.1	39.4	51.6	35.4
H	27.2	9.6	34.4	45.2	33.1
I	26.9	10.6	38.8	51.4	34.7
J	29.5	9.8	44.1	54.4	37.9
K	26.1	9.9	32.6	41.3	31.6
L	27.4	9.8	34.1	43.6	31.5
M	27.5	10.5	38.6	49.1	36.5
N	26.5	9.3	35.9	45.7	32.9
O	27.3	9.1	34.1	42.5	31.7
P	27.9	11.3	34.5	46.1	30.8
Q	27.4	10.2	34.7	48.0	31.7
R	26.6	10.7	35.7	45.4	31.7
S	26.6	10.2	35.3	49.3	32.7
Current F.K.I. Average	27.3	10.2	36.2	46.6	32.8
Cumulative F.K.I. Average	27.2	10.2	36.8	47.0	32.9
F.K.I. Index, %	100.5	100.0	98.5	99.1	99.8

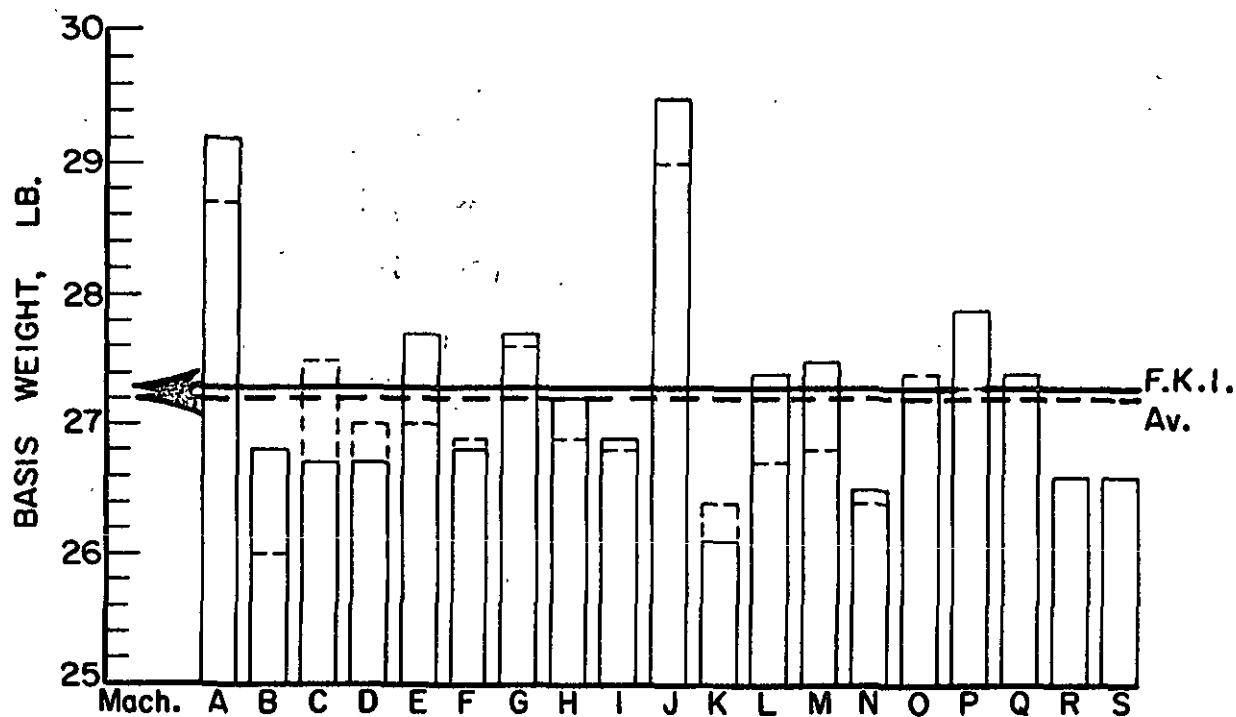


Figure 1

Comparison of Basis Weight Results for November, 1959

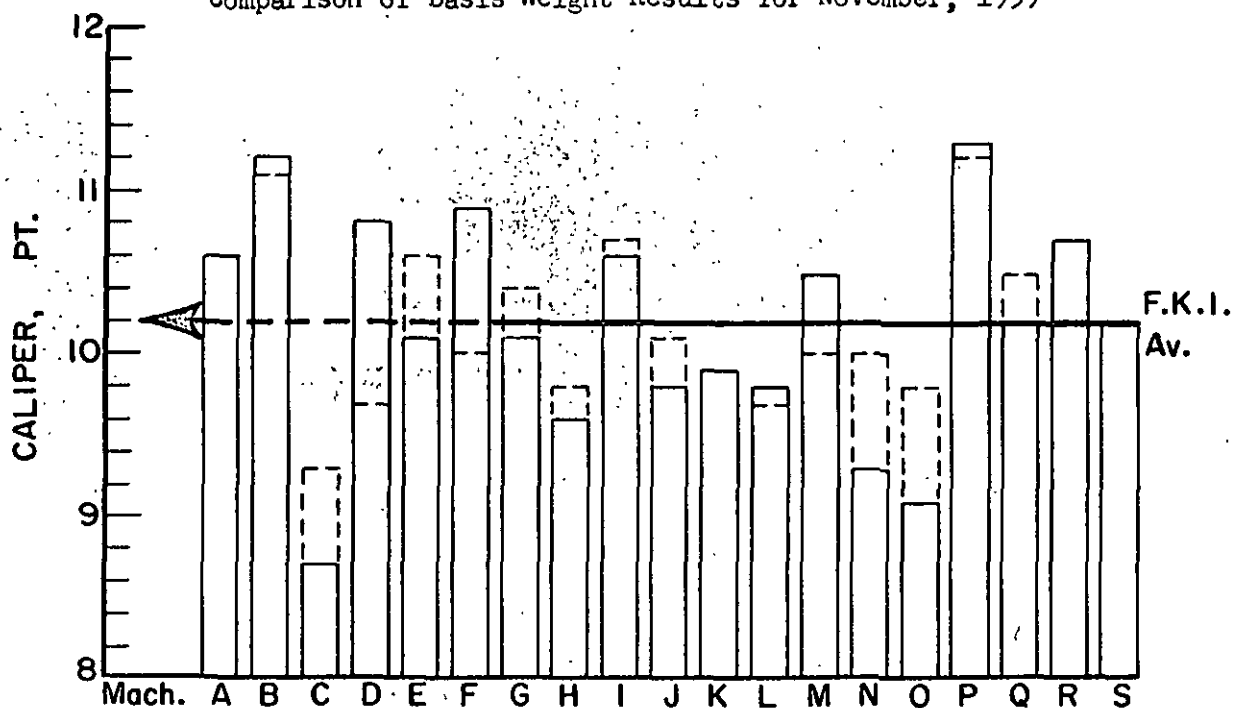


Figure 2

Comparison of Caliper Results for November, 1959

———— Current machine average
----- Cumulative machine average

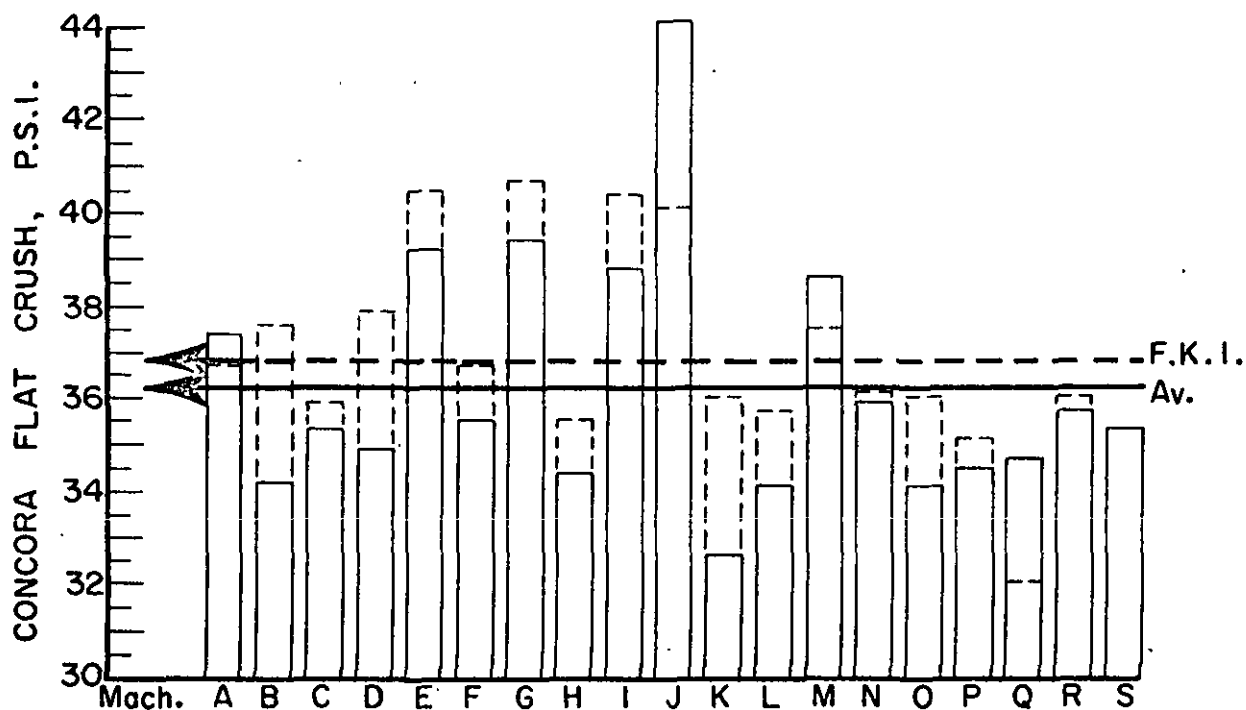


Figure 3

Comparison of Concora Flat Crush Results (Conditioned) for November, 1959

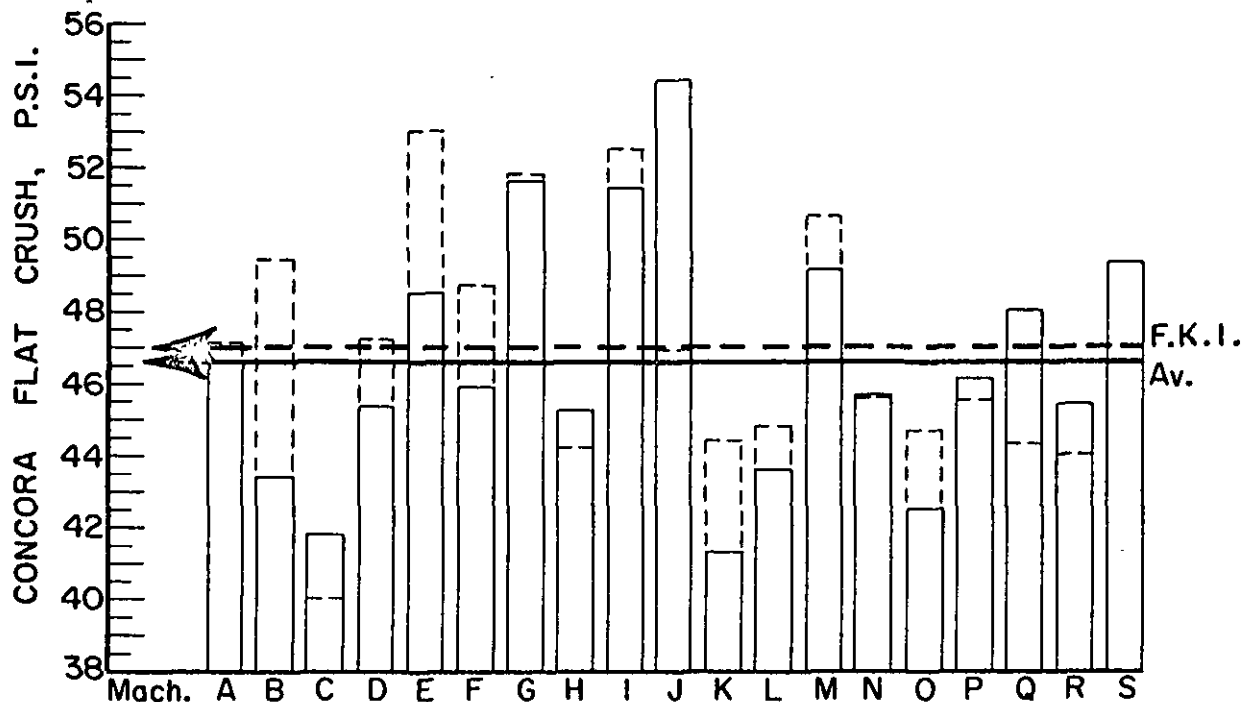
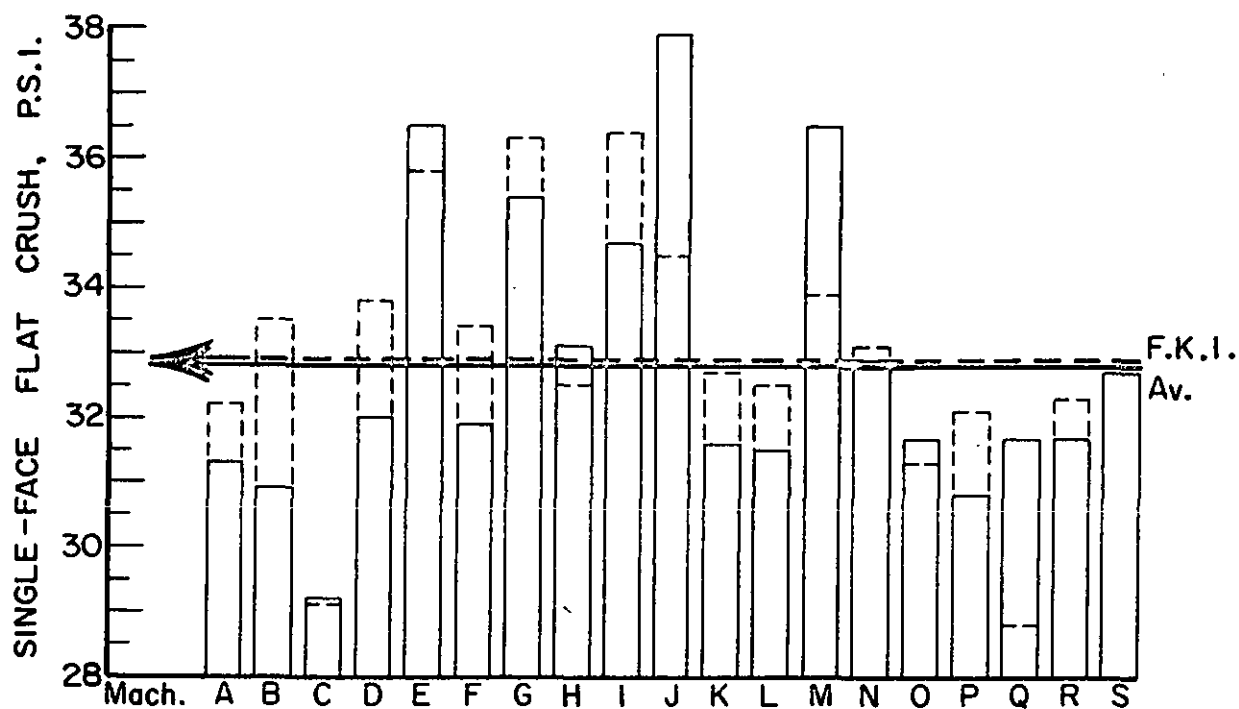


Figure 4

Comparison of Concora Flat Crush Results (Tested Immediately) for November, 1959

- Current machine average
- Cumulative machine average



Comparison of Single-Face Flat Crush Results for November, 1959

—— Current mill average
----- Cumulative mill average

In Table II the current machine averages for the month of November are summarized. It may be noted in Table II and Figure 1 that basis weight varied from a low of 26.1 lb. for Machine K to a high of 29.5 lb. for Machine J. The current F.K.I. average for basis weight was 27.3 lb., which was slightly higher than the cumulative F.K.I. average of 27.2 lb. Of the current machine averages shown in Table II, none was below the 26-lb. minimum requirement of Rule 41. On the basis of individual rolls, it may be noted that the tabulated data for each machine shown in Tables III through XXI included only four basis weight averages which were below 26 lb.

With regard to the caliper results for the current period, it may be seen in Table II and also in Figure 2 that the lowest average caliper data of 8.7 points was associated with Machine C and the highest average of 11.3 points with Machine P. The current F.K.I. average of 10.2 points was the same as the cumulative F.K.I. average. The minimum caliper requirement of nine points specified in Rule 41 was met by all participants except Machine C on the basis of the current machine averages shown in Table II. Based on individual rolls, four caliper averages were below 9 points.

The Concora flat crush averages obtained on specimens conditioned after fluting are presented graphically in Figure 3 based on the data in Table II. An inspection of these results reveals that 44.1 p.s.i. was the highest average and 32.6 p.s.i. the lowest. Machine J had the highest average and Machine K the lowest. The current F.K.I. average of 36.2 p.s.i. was slightly lower than the cumulative F.K.I. average of 36.8 p.s.i.

The Concora flat crush averages obtained on specimens tested immediately after fluting are shown graphically in Figure 4 and were obtained from Table II. Machine J had the highest average of 54.4 p.s.i. and Machine K the lowest average of 41.3 p.s.i. The current F.K.I. average was 46.6 p.s.i. which was slightly lower than the cumulative F.K.I. average of 47.0 p.s.i.

The highest single-face flat crush average of 37.9 p.s.i. was obtained for Machine J and the lowest of 29.2 p.s.i. for Machine C. These data are shown in Table II and are presented graphically in Figure 5. The current F.K.I. average was 32.8 p.s.i., whereas the cumulative F.K.I. average was 32.9 p.s.i.

For the current period, the current F.K.I. average for basis weight was higher than the cumulative F.K.I. average, the current F.K.I. average for caliper was the same as the cumulative F.K.I. average, and the current F.K.I. averages for Concora flat crush (conditioned), Concora flat crush (tested immediately), and single-face flat crush were lower than their respective cumulative F.K.I. averages.

The test results obtained on the sample lots submitted from the production of each of the machines are shown in Tables III through XXI for Machines A through S, respectively. The maximum, minimum, and average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition, the over-all average result for all sample lots submitted from a given machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average is also shown and is calculated by averaging

the current machine averages for the previous twelve periods (excluding the current period). Also shown for each machine in Tables III to XXI are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for that particular machine or with the cumulative results for all machines--i.e., the cumulative F.K.I. average.

TABLE III
SUMMARY OF TEST RESULTS FOR MACHINE A
November, 1959

Date	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)		Concora Flat Crush, p.s.i. (Tested Immediately)		Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
A-1	10-15-59	279	29.0	11.0	10.0	37.2	34.2	35.9	48.6	42.6	45.7	1-1/2
A-2	10-17-59	280	29.2	11.0	10.7	39.0	36.0	37.7	47.4	44.4	46.1	1
A-3	10-22-59	281	29.3	11.0	10.5	38.4	34.2	36.6	52.2	45.0	47.3	1-1/2
A-4	10-29-59	282	29.4	11.2	10.3	40.8	37.8	39.4	52.2	46.2	48.5	1
A-5	10-30-59	283	29.8	10.9	10.1	40.2	33.6	38.2	45.6	43.2	44.4	1/2
A-6	11-4-59	284	28.8	10.7	9.9	39.6	35.4	37.9	49.8	43.8	47.8	1-1/2
A-7	11-7-59	285	29.5	11.0	10.6	39.0	33.6	36.6	51.0	45.0	46.8	1-1/2
A-8	11-11-59	286	28.9	10.8	10.0	41.4	36.0	37.8	51.0	45.0	47.5	1-1/2
A-9	11-12-59	287	29.0	11.1	10.0	39.6	33.0	36.8	46.8	43.2	45.7	1-1/2
Current Machine Average												
			29.2	10.6		37.4		46.6		31.3		
Cumulative Machine Average			28.7	10.6		36.7		47.1		32.2		
Machine Factor, %			101.8	100.0		102.0		99.0		97.1		
Machine Index, %			107.6	104.5		101.7		99.2		95.1		

TABLE IV
SUMMARY OF TEST RESULTS FOR MACHINE B
November, 1959

Code	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)		Concora Flat Crush, p.s.i. (Tested Immediately)		Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
B-1	10-26-59	3	27.3	12.0	11.4	11.7	34.2	35.2	42.6	39.6	40.8	1
B-2	10-26-59	4	26.6	10.7	10.1	10.4	34.8	36.1	45.0	43.2	43.8	1-1/2
B-3	10-21-59	5	26.3	10.2	9.7	10.0	32.4	36.2	47.4	43.2	44.9	1-1/2
B-4	10-23-59	6	27.9	11.7	10.6	11.0	38.4	35.5	43.6	38.4	44.8	1
B-5	10-27-59	7	25.1	11.4	10.3	10.6	31.8	33.8	49.2	42.6	45.4	1
B-6	11-2-59	8	26.5	12.7	11.5	12.0	32.4	34.8	48.6	40.8	44.5	1/2
B-7	11-5-59	9	27.4	12.0	10.7	11.4	30.0	33.2	54.6	37.8	44.6	1
B-8	11-9-59	10	27.2	12.7	11.8	12.2	29.4	30.5	40.8	37.2	39.0	1
B-9	11-11-59	11	26.5	11.8	10.9	11.2	34.8	32.8	46.8	37.8	42.6	1-1/2
Current Machine Average			26.8			11.2		34.2		43.4		30.9
Cumulative Machine Average			26.0			11.1		37.6		49.4		33.5
Machine Factor, %			102.8			100.5		91.1		87.9		92.3
Machine Index, %			98.5			109.7		93.1		92.2		93.9

TABLE V
SUMMARY OF TEST RESULTS FOR MACHINE C
November, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.	
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.				
C-1	11-5-59	11-20-59	39	27.3	9.2	8.5	8.9	39.6	33.0	36.2	45.6	38.4	41.6	33.0	29.2	30.7	Note a
C-2	11-5-59	11-20-59	40	27.4	9.2	8.8	9.0	38.4	31.8	35.4	47.4	43.2	44.4	31.6	28.0	30.4	1/2
C-3	11-7-59	11-20-59	41	26.0	9.1	8.0	8.5	37.8	34.2	35.2	43.8	39.0	40.7	28.0	26.4	27.2	1-1/2
C-4	11-7-59	11-20-59	42	26.4	8.8	8.3	8.5	36.6	31.2	34.4	42.6	38.4	40.3	29.8	27.4	23.6	1-1/2
Current Machine Average				26.7			8.7			35.3			41.8			29.2	
Cumulative Machine Average				27.5			9.3			35.9			40.0			29.1	
Machine Factor, %				97.3			93.5			98.3			104.4			100.2	
Machine Index, %				98.5			85.6			96.0			88.8			88.8	

a Maximum speed at minimum tension for this roll was 575 f.p.m.

TABLE VI
SUMMARY OF TEST RESULTS FOR MACHINE D
November, 1959

Code	Date Made	Date Recd.	Basis Weight, lb. per 1000 sq. ft.	Galiper, points		Concora Flat Crush, p.s.i. (Conditioned)				Concora Flat Crush, p.s.i. (Tested Immediately)				Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.
				Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
D-1	10-15-59	10-26-59	25.2	10.4	9.3	9.9	34.2	30.6	32.6	50.4	40.2	45.2	34.0	29.6	31.9	1-1/2
D-2	10-21-59	10-27-59	27.4	10.9	10.0	10.5	38.4	33.0	35.3	49.2	40.8	43.7	33.0	28.2	31.6	1-1/2
D-3	10-24-59	11-6-59	26.0	11.0	9.5	10.2	35.4	30.6	33.1	50.4	41.4	44.5	32.6	28.2	31.0	1-1/2
D-4	10-25-59	11-6-59	27.4	12.6	10.8	11.7	37.2	33.0	35.0	51.6	43.2	46.7	35.0	33.8	34.4	1-1/2
D-5	11-1-59	11-6-59	26.4	11.1	10.1	10.5	35.4	31.2	32.9	46.2	40.8	43.1	34.2	30.4	32.4	1-1/2
D-6	11-11-59	11-23-59	26.6	12.4	9.6	10.6	36.6	31.2	34.1	47.4	41.4	45.0	32.4	30.4	31.4	1-1/2
D-7	11-14-59	11-23-59	26.9	12.0	10.4	11.1	40.2	34.8	37.2	49.8	44.4	47.0	33.6	29.6	31.6	1-1/2
D-8	11-15-59	11-24-59	27.5	11.7	9.9	11.0	42.6	35.4	38.8	48.6	45.0	47.0	35.0	31.2	33.0	1-1/2
D-9	11-15-59	11-24-59	27.0	13.0	10.0	11.2	33.6	31.2	32.2	46.2	43.2	44.6	32.2	29.6	30.8	1-1/2
D-10	11-16-59	11-24-59	27.1	13.0	10.0	11.2	39.6	35.4	37.6	50.4	41.4	46.4	32.8	31.2	32.0	1-1/2
Current Machine Average			26.7			10.8			34.9			45.3			32.0	
Cumulative Machine Average			27.0			9.7			37.9			47.2			33.8	
Machine Factor, %			99.0			111.2			92.1			96.0			94.6	
Machine Index, %			98.5			106.1			94.8			96.4			97.2	

TABLE VII
SUMMARY OF TEST RESULTS FOR MACHINE E
November, 1959

Date	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.		
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.				
E-1	10-7-59	10-28-59	195	25.2	10.1	9.2	9.9	40.8	34.2	37.9	51.0	42.0	46.8	37.2	34.4	36.0	1/2
E-2	10-12-59	10-28-59	322	29.8	10.1	9.9	10.0	40.8	37.2	39.1	54.6	48.0	51.4	40.4	36.6	38.0	1-1/2
E-3	10-15-59	10-28-59	405	27.4	10.5	10.0	10.2	38.4	34.8	36.5	49.2	43.8	46.8	36.0	32.4	34.5	1-1/2
E-4	10-23-59	11-6-59	618	28.7	11.2	10.4	10.8	46.8	40.8	44.0	55.8	50.4	53.0	43.0	40.6	41.9	1
E-5	10-28-59	11-6-59	738	26.7	9.9	9.4	9.6	37.8	34.8	36.6	46.2	43.2	44.2	32.6	30.0	31.0	1-1/2
E-6	10-29-59	11-17-59	780	27.6	10.8	10.0	10.3	45.0	38.4	42.7	55.2	48.0	51.4	40.4	38.8	39.6	1/2
E-7	11-3-59	11-17-59	70	27.1	11.0	9.9	10.2	39.6	35.4	37.7	49.2	41.4	45.8	35.6	32.0	34.2	1
Current Machine Average				27.7			10.1			39.2			48.5			36.5	
Cumulative Machine Average				27.0			10.6			40.5			53.0			35.8	
Machine Factor, %				102.5			96.0			96.8			91.6			101.8	
Machine Index, %				101.9			99.5			106.6			103.1			110.8	

TABLE VIII
SUMMARY OF TEST RESULTS FOR MACHINE F
November, 1959

Date	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.		
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.				
F-1	10-7-59	10-26-59	208	26.1	10.3	10.0	10.2	40.8	34.8	37.2	46.8	42.6	44.6	33.0	30.6	32.2	1-1/2
F-2	10-9-59	10-26-59	209	25.6	10.5	10.0	10.2	38.4	31.8	35.9	47.4	45.0	45.8	32.2	30.2	31.4	1-1/2
F-3	10-15-59	11-3-59	210	26.6	11.4	10.7	11.0	34.2	28.8	31.6	46.8	40.2	43.0	30.0	28.8	29.3	1
F-4	10-17-59	11-3-59	211	26.6	10.8	10.6	10.7	37.2	30.0	33.2	48.6	38.4	42.8	30.8	28.4	29.6	1-1/2
F-5	10-19-59	11-3-59	212	27.1	11.6	11.0	11.2	34.2	30.0	32.6	47.4	43.8	45.2	31.4	29.6	30.8	1-1/2
F-6	10-22-59	11-3-59	213	27.5	11.2	10.7	11.1	36.6	34.8	35.4	52.2	46.2	49.0	33.4	31.4	32.4	1-1/2
F-7	10-25-59	11-3-59	214	27.2	11.2	10.6	11.0	35.4	32.4	33.7	45.0	42.6	44.2	33.2	30.2	31.9	1-1/2
F-8	10-26-59	11-3-59	215	26.8	11.1	10.4	10.9	36.0	33.0	34.4	46.2	36.6	41.9	32.2	31.0	31.6	1-1/2
F-9	11-3-59	11-17-59	216	27.0	11.1	10.8	11.0	40.2	36.6	38.0	49.2	46.8	47.9	35.0	33.2	34.3	1-1/2
F-10	11-5-59	11-17-59	217	27.0	11.2	10.5	10.9	39.6	38.4	38.8	51.0	44.4	48.7	34.6	32.4	33.5	1-1/2
F-11	11-9-59	11-23-59	219	27.1	11.6	10.9	11.2	37.2	34.2	35.8	52.2	46.8	50.3	35.2	30.6	32.1	1-1/2
F-12	11-12-59	11-23-59	220	27.4	11.4	10.8	11.0	43.2	36.6	38.9	51.0	45.0	47.9	34.4	33.4	33.9	1-1/2
Current Machine Average				26.8	10.9		35.5		45.9		31.9						
Cumulative Machine Average				26.9	10.0		36.7		48.7		33.4						
Machine Factor, %				99.8	108.3		96.7		94.3		95.6						
Machine Index, %				98.8	106.6		96.4		97.7		97.0						

TABLE IX
SUMMARY OF TEST RESULTS FOR MACHINE G
November, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	
G-1	10-13-59	10-26-59	354	27.7	10.1	9.8	10.0	42.6	39.6	40.9	56.4	50.4	52.2	37.4	35.0	35.8	1-1/2
G-2	10-15-59	11-4-59	355	27.4	10.0	9.4	9.8	43.8	37.2	39.7	54.6	46.8	51.0	39.2	35.4	37.4	1-1/2
G-3	10-21-59	11-4-59	356	27.9	10.7	10.1	10.3	40.8	37.8	38.6	55.2	46.8	52.2	36.4	34.4	35.4	1-1/2
G-4	10-24-59	11-9-59	357	27.7	10.9	9.8	10.1	42.6	38.4	40.9	61.2	51.0	54.0	36.4	34.6	35.2	1-1/2
G-5	10-27-59	11-9-59	358	28.1	10.2	9.8	9.9	43.2	37.8	40.1	52.8	46.8	49.9	38.0	33.4	35.4	1-1/2
G-6	10-29-59	11-10-59	359	28.0	10.8	10.2	10.4	40.2	35.4	37.6	49.8	44.4	47.5	36.4	33.4	34.9	1-1/2
G-7	11-3-59	11-12-59	360	27.5	10.0	9.7	9.9	41.4	37.2	40.0	53.4	50.4	52.1	37.8	36.2	37.2	1-1/2
G-8	11-8-59	11-18-59	361	27.7	10.0	9.7	9.8	41.4	37.8	39.4	54.0	50.4	51.5	34.8	32.6	33.6	1-1/2
G-9	11-9-59	11-23-59	362	27.9	10.9	9.9	10.3	39.6	37.2	38.3	56.4	48.6	52.0	35.8	32.0	33.5	1-1/2
G-10	11-12-59	11-23-59	363	27.0	10.4	10.0	10.2	45.0	34.8	38.4	58.2	49.8	53.8	37.4	34.4	36.1	1-1/2
Current Machine Average				27.7	10.1			39.4			51.6			35.4			
Cumulative Machine Average				27.6	10.4			40.7			51.8			36.3			
Machine Factor, %				100.2	96.7			96.9			99.6			97.6			
Machine Index, %				102.0	98.9			107.0			109.8			107.7			

TABLE X
SUMMARY OF TEST RESULTS FOR MACHINE H
November, 1959

Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.	
				Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.		Av.
H-1	10-2-59	11-5-59	--	9.8	9.3	9.6	38.4	31.2	35.0	49.2	43.8	45.7	34.6	31.8	33.0	1-1/2
H-2	10-6-59	11-5-59	445	10.0	9.6	9.8	34.2	31.8	33.0	52.2	44.4	49.1	35.8	30.4	32.9	1-1/2
H-3	10-11-59	11-5-59	796	10.1	9.7	9.9	37.2	30.0	35.0	49.2	43.8	47.0	35.6	30.6	32.4	1-1/2
H-4	10-12-59	11-5-59	900	9.7	9.2	9.4	37.2	31.2	35.4	48.6	43.2	45.0	35.6	31.8	34.2	1-1/2
H-5	10-15-59	11-17-59	1155	9.7	9.2	9.4	36.6	31.2	34.8	49.2	42.0	45.2	35.8	31.2	33.9	1-1/2
H-6	10-19-59	11-17-59	1389	9.7	9.2	9.3	35.4	30.6	32.9	42.6	36.0	39.4	33.6	30.2	32.3	1-1/2
Current Machine Average				9.6		9.6	34.4			45.2			33.1			
Cumulative Machine Average				9.8		9.8	35.5			44.2			32.5			
Machine Factor, %				97.9		97.9	96.7			102.4			101.9			
Machine Index, %				93.9		93.9	93.4			96.2			100.6			

TABLE XI
SUMMARY OF TEST RESULTS FOR MACHINE I
November, 1959

Roll No.	Date Recd.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)				Concora Flat Crush, p.s.i. (Tested Immediately)				Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.
			Max.	Min.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.		
I-1	10-21-59	26.1	10.8	9.3	10.0	40.8	36.0	37.1	52.8	51.0	52.0	36.2	33.0	34.6	1-1/2
I-2	10-27-59	26.3	11.9	10.3	10.9	36.0	34.2	35.4	47.4	41.4	45.5	34.8	32.0	32.7	1-1/2
I-3	11-3-59	28.3	11.0	10.4	10.7	43.2	37.8	40.6	59.4	43.6	52.9	37.8	34.6	36.6	1-1/2
I-4	11-6-59	27.0	10.6	10.1	10.4	42.6	37.2	39.2	56.4	49.2	51.6	35.6	33.4	34.7	1-1/2
I-5	11-13-59	26.3	11.0	10.4	10.7	42.6	36.6	40.2	55.2	51.0	53.3	33.2	32.8	33.0	1-1/2
I-6	11-18-59	26.8	12.3	10.6	11.0	41.4	39.0	40.6	55.8	51.6	53.4	36.4	33.6	35.3	1-1/2
I-7	11-20-59	27.3	10.7	10.0	10.3	41.4	36.0	38.5	54.6	46.2	50.9	37.0	35.0	35.9	1-1/2
Current Machine Average															
Cumulative Machine Average			26.9					38.8			51.4			34.7	
Machine Factor, %			26.8					40.4			52.5			36.4	
Machine Index, %			100.2					95.9			97.8			95.2	
			99.0					105.4			109.2			105.3	

TABLE XII
SUMMARY OF TEST RESULTS FOR MACHINE J
November, 1959

	J-1	10-10-59	10-26-59	178	29.7	10.3	9.7	10.0	49.2	45.6	47.2	58.8	51.0	54.2	41.0	37.0	39.4	Note a
	J-2	10-15-59	10-26-59	179	29.6	9.8	9.3	9.5	47.4	43.2	44.6	60.0	55.2	58.3	40.4	36.0	38.4	Note b
	J-3	10-16-59	10-26-59	180	29.2	10.0	9.3	9.8	42.0	37.2	40.6	54.0	46.8	50.5	37.4	34.6	36.0	Min.
Current Machine Average																		
Cumulative Machine Average																		
Machine Factor, %																		
Machine Index, %																		
					29.5		9.8				44.1			54.4			37.9	
					29.0		10.1				40.1			46.9			34.5	
					101.8		96.6				110.1			115.9			110.0	
					108.7		95.9				119.9			115.6			115.3	

a Maximum speed at minimum tension for this roll was 500 f.p.m.

b Maximum speed at minimum tension for this roll was 575 f.p.m.

TABLE XIII
SUMMARY OF TEST RESULTS FOR MACHINE K
November, 1959

Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)				Concora Flat Crush, p.s.i. (Tested Immediately)				Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.
				Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
K-1	10-27-59	11-6-59	26.1	10.1	9.6	9.9	34.8	30.6	32.6	44.4	37.8	41.3	32.8	30.8	31.6	1
Current Machine Average																
Cumulative Machine Average																
Machine Factor, %																
Machine Index, %																
			26.1			9.9			36.6			41.3			31.6	
			26.4			9.9			36.0			44.4			32.7	
			99.0			100.0			90.6			93.0			96.6	
			96.1			96.9			88.7			87.8			96.0	

TABLE XIV
SUMMARY OF TEST RESULTS FOR MACHINE L
November, 1959

L-1	9-30-59	11-5-59	2374	26.7	9.6	8.9	9.3	36.6	31.2	33.6	48.0	39.0	43.1	33.0	28.2	29.7	1-1/2
L-2	10-4-59	11-5-59	214	27.3	10.4	9.9	10.1	36.6	31.8	33.7	48.0	40.8	43.1	32.6	29.0	30.8	1-1/2
L-3	10-10-59	11-5-59	755	27.4	10.0	9.2	9.7	36.0	31.2	33.6	46.8	40.2	43.4	33.0	29.0	31.1	1-1/2
L-4	10-14-59	11-5-59	1041	28.5	10.4	10.1	10.3	41.4	34.8	38.3	50.4	40.8	45.2	36.6	33.4	35.0	1-1/2
L-5	10-18-59	11-17-59	1399	27.6	10.0	9.9	10.0	35.4	30.0	33.0	46.2	37.8	41.2	33.0	30.0	31.2	1-1/2
L-6	10-22-59	11-17-59	1712	26.7	10.0	9.4	9.8	34.2	30.6	32.2	49.2	42.6	45.5	33.2	29.8	31.4	1-1/2
Current Machine Average																	
Cumulative Machine Average																	
Machine Factor, %																	
Machine Index, %																	
			27.4			9.8			34.1				43.6			31.5	
			26.7			9.7			35.7			-	44.8			32.5	
			102.3			101.4			95.5				97.2			96.9	
			100.8			96.6			92.6				92.7			95.8	

TABLE IV
SUMMARY OF TEST RESULTS FOR MACHINE M
November, 1959

Code	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)		Concora Flat Crush, p.s.i. (Tested Immediately)		Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.					
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.						
K-1	10-29-59	11- 6-59	--	10.8	10.3	10.5	41.4	34.8	38.6	54.6	45.0	49.1	37.8	35.4	36.5	1-1/2	
Current Machine Average																	
Cumulative Machine Average																	
Machine Factor, %																	
Machine Index, %																	
				10.5		10.5		38.6		38.6		49.1		36.5		36.5	
				26.8		10.0		37.5		50.6		33.9		33.9		33.9	
				102.5		105.7		103.0		97.0		107.7		107.7		107.7	
				101.3		103.2		105.0		104.4		111.0		111.0		111.0	

TABLE XVI
SUMMARY OF TEST RESULTS FOR MACHINE N
November, 1959

N-1	10-28-59	11- 6-59	--	26.5	9.7	9.1	9.3	37.8	31.8	35.9	48.6	40.8	45.7	33.6	32.0	32.9	1
Current Machine Average																	
Cumulative Machine Average																	
Machine Factor, %																	
Machine Index, %																	
				26.5			9.3			35.9			45.7			32.9	
				26.4			10.0			36.1			45.6			33.1	
				100.5			92.9			99.5			100.2			99.5	
				97.7			91.3			97.5			97.2			100.0	

TABLE XVII
SUMMARY OF TEST RESULTS FOR MACHINE O
November, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points		Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.		Runability Maximum Tension at 600 f.p.m., lb./in.		
					Max.	Min.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.		Av.	
0-1	10-20-59	10-26-59	187	27.4	9.3	9.0	9.2	36.6	31.2	33.5	44.4	35.4	39.5	33.8	32.2	32.8	1-1/2
0-2	10-20-59	10-26-59	188	27.4	9.5	8.6	9.1	37.2	30.0	33.8	42.6	36.6	40.6	31.6	30.6	31.2	1-1/2
0-3	10-20-59	10-26-59	193	27.0	9.1	8.7	8.9	33.6	31.2	32.0	44.4	40.8	43.1	31.8	29.2	30.5	1-1/2
0-4	10-20-59	10-26-59	194	27.4	9.1	8.7	9.0	34.8	31.8	33.5	43.8	39.6	42.0	32.8	30.0	31.5	1-1/2
0-5	11-13-59	11-17-59	205	27.4	9.5	8.0	9.0	38.4	34.8	36.5	48.6	40.8	45.1	33.8	31.0	32.5	1-1/2
0-6	11-13-59	11-17-59	206	27.4	9.6	9.0	9.3	36.6	34.2	35.2	49.8	42.0	44.6	33.6	28.4	31.5	1-1/2
Current Machine Average				27.3	9.1		9.1	34.1		42.5		31.7					
Cumulative Machine Average				27.4	9.8		9.8	36.0		44.7		31.3					
Machine Factor, %				99.9	92.3		92.3	94.8		95.0		101.2					
Machine Index, %				100.7	89.0		89.0	92.6		90.3		96.2					

TABLE XVIII
SUMMARY OF TEST RESULTS FOR MACHINE P
November, 1959

Code	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Tension at 600 f.p.m., lb./in.	Runability Maximum
				Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.		
P-1	10-28-59	193	27.6	12.0	11.2	11.5	36.6	31.2	33.0	49.2	41.4	45.6	31.8	30.4	31.2	1-1/2	
P-2	10-29-59	194	27.4	11.8	11.2	11.6	35.4	31.2	33.0	47.4	43.2	45.5	28.2	25.6	27.4	1/2	
P-3	11-12-59	205	27.7	11.5	10.6	11.1	37.2	33.0	35.5	51.0	43.2	46.9	33.0	31.0	31.9	1-1/2	
P-4	11-12-59	206	28.7	11.3	10.3	11.0	37.8	34.2	36.4	48.0	43.8	46.4	33.8	31.8	32.8	1-1/2	
Current Machine Average			27.9			11.3			34.5			46.1			30.8		
Cumulative Machine Average			27.3			11.2			35.1			45.5			32.1		
Machine Factor, %			101.9			101.2			98.2			101.3			95.9		
Machine Index, %			102.6			110.9			93.7			98.1			93.6		

TABLE XIX
SUMMARY OF TEST RESULTS FOR MACHINE Q

Q-1	11- 5-59	11-16-59	201	27.9	10.6	9.8	10.2	37.8	34.2	35.6	52.2	46.8	49.6	34.4	32.0	33.4	1-1/2
Q-2	11- 5-59	11-16-59	202	26.8	10.3	10.0	10.1	34.8	32.4	33.8	49.8	43.2	46.4	30.6	29.2	30.0	1-1/2
Current Machine Average																	
Cumulative Machine Average				27.4			10.2			34.7			48.0			31.7	
Machine Factor, %				27.4			10.5			32.0			44.3			28.8	
Machine Index, %				100.0			96.6			108.5			108.3			109.9	
				100.8			99.6			94.4			102.1			96.2	

TABLE XI
SUMMARY OF TEST RESULTS FOR MACHINE R
November, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
R-1	9-24-59	10-28-59	41	26.7	10.9	10.0	10.6	37.2	34.2	35.8	52.2	40.8	46.0	33.8	31.8	32.8	1/2
R-2	10-9-59	10-28-59	42	26.7	10.9	10.1	10.5	36.6	34.8	35.9	47.4	41.4	44.4	34.0	31.0	32.6	1
R-3	10-15-59	10-28-59	43	27.4	11.0	10.9	11.0	39.6	35.4	37.6	51.0	45.6	48.2	34.2	29.0	31.6	1
R-4	10-21-59	10-28-59	44	25.7	10.9	10.1	10.6	35.4	31.2	33.5	48.0	38.4	43.1	31.4	29.2	30.0	1-1/2
Current Machine Average				26.6			10.7			35.7			45.4			31.7	
Cumulative Machine Average				26.6			10.7			36.0			44.0			32.3	
Machine Factor, %				100.0			100.0			99.0			103.3			98.1	
Machine Index, %				98.1			104.6			97.0			96.6			96.4	

TABLE XII
SUMMARY OF TEST RESULTS FOR MACHINE S
November, 1959

Code	Date Made	Date Recd.	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i. (Conditioned)			Concora Flat Crush, p.s.i. (Tested Immediately)			Single-Face Flat Crush, p.s.i.			Runability Maximum Tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
S-1	11-5-59	11-11-59	203	26.6	10.4	9.1	10.0	39.0	36.0	37.6	54.6	48.0	51.1	34.0	33.0	33.5	1-1/2
S-2	11-5-59	11-11-59	204	26.6	11.0	10.0	10.5	34.8	30.6	33.0	50.4	43.8	47.4	33.0	31.0	31.9	1-1/2
Current Machine Average				26.6			10.2			35.3			49.3			32.7	
Cumulative Machine Average				--			--			--			--			--	
Machine Factor, %				--			--			--			--			--	
Machine Index, %				97.9			100.3			95.9			104.8			99.3	

DISCUSSION OF CONCORA FLAT CRUSH TEST RESULTS OBTAINED AT THE
INSTITUTE OF PAPER CHEMISTRY AND THOSE OBTAINED AT THE MILLS

In Table XXII a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for the month of November. These comparisons were initiated in Progress Report 30 and permit interested participants to submit their Concora flat crush test results to The Institute of Paper Chemistry so that comparative results may be included in the monthly reports. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. It may be noted in Table XXII that seventeen of the nineteen participating machines are included in this comparison of Concora flat crush data. Shown in Table XXII are the Institute and mill Concora averages for each roll included in this comparison. In a few cases mill averages were not submitted for all rolls. In these instances, the current machine average based on Institute data included only those rolls for which mill data were received. The average difference between the current machine average based on Institute data and that based on mill data is shown in Table XXII for each machine. For each roll the difference between the average Concora result based on Institute data and that based on mill data is also shown. The plus or minus sign denotes whether the mill average was higher or lower than the Institute average.

TABLE XXII

INSTITUTE AND MILL CONCORDA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR NOVEMBER, 1959

Machine C					Machine D					Machine E				
Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Code	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a
C-1 39	11-5-59	36.2	36.6	+0.4	D-3 323	10-24-59	33.1	34.8	+1.7	E-1 195	10-7-59	37.9	34.6	-3.3
C-2 40	11-5-59	35.4	35.8	+0.4	D-4 324	10-25-59	35.0	39.8	+4.8	E-2 322	10-12-59	39.1	41.6	+2.5
C-3 41	11-7-59	35.2	32.3	-2.9	D-5 325	11-1-59	34.9	38.1	+3.2	E-3 405	10-15-59	36.5	35.8	-0.7
C-4 42	11-7-59	34.4	33.7	-0.7	D-6 327	11-11-59	34.1	38.1	+4.0	E-4 618	10-23-59	44.0	37.2	-6.8
					D-7 328	11-14-59	37.2	37.3	+0.1	E-5 738	10-28-59	36.6	35.8	-0.8
					D-8 329	11-15-59	38.8	42.5	+3.7	E-6 780	10-29-59	42.7	40.8	-1.9
					D-9 330	11-15-59	32.2	39.2	+7.0	E-7 70	11-3-59	37.7	38.0	+0.3
					D-10 331	11-16-59	37.6	39.0	+1.4					
Current Machine Av.		35.3	34.6	-0.7	Current Machine Av.		35.1	38.6	+3.5	Current Machine Av.		39.2	37.7	-1.5
Machine F					Machine G					Machine H				
Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Code	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a
F-1 208	10-7-59	37.2	36.1	-1.1	G-1 354	10-13-59	40.9	39.2	-1.7	H-1 --	10-2-59	35.0	33.3	-1.7
F-2 209	10-9-59	35.9	36.0	+0.1	G-2 355	10-15-59	39.7	38.2	-1.5	H-2 445	10-6-59	33.0	35.7	+2.7
F-3 210	10-15-59	31.6	36.0	+4.4	G-3 356	10-21-59	38.6	39.0	+0.4	H-3 796	10-11-59	35.0	36.4	+1.4
F-4 211	10-17-59	33.2	35.9	+2.7	G-4 357	10-24-59	40.9	37.3	-3.6	H-4 900	10-12-59	35.4	36.9	+1.5
F-5 212	10-19-59	32.6	35.3	+2.7	G-5 358	10-27-59	40.1	38.9	-1.2	H-5 1155	10-15-59	34.8	36.2	+1.4
F-6 213	10-22-59	35.4	39.6	+4.2	G-6 359	10-29-59	37.6	38.2	+0.6	H-6 1389	10-19-59	32.9	33.4	+0.5
F-7 214	10-25-59	33.7	35.0	+1.3	G-7 360	11-3-59	40.0	39.1	-0.9					
F-8 215	10-26-59	34.4	35.5	+1.1	G-8 361	11-8-59	39.4	39.4	0.0					
F-9 216	11-3-59	38.0	36.2	-1.8	G-9 362	11-9-59	38.3	37.3	-1.0					
F-10 217	11-5-59	38.8	34.7	-4.1	G-10 363	11-12-59	38.4	38.5	+0.1					
F-11 219	11-9-59	35.8	35.0	-0.8										
F-12 220	11-12-59	38.9	36.2	-2.7										
Current Machine Av.		35.5	36.0	+0.5	Current Machine Av.		39.4	38.5	-0.9	Current Machine Av.		34.4	35.3	+0.9
Machine I					Machine J					Machine K				
Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Roll No.	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a	Mill Code	Date Made	Concorda Insti-tute	Flat Crush, P.s.i.	Differ-ence a
I-1 515	10-21-59	37.1	42.5	+5.4	J-1 178	10-10-59	47.2	40.7	-6.5	K-1 --	10-27-59	32.6	33.1	+0.5
I-2 516	10-27-59	35.4	39.8	+4.4	J-2 179	10-15-59	44.6	42.6	-2.0					
I-3 517	11-3-59	40.6	39.6	-1.0	J-3 180	10-16-59	40.6	36.8	-3.8					
I-4 518	11-6-59	39.2	41.0	+1.8										
I-5 519	11-13-59	40.2	40.2	0.0										
I-6 520	11-18-59	40.6	43.9	+3.3										
I-7 521	11-20-59	38.5	43.6	+5.1										
Current Machine Av.		38.8	41.5	+2.7	Current Machine Av.		44.1	40.0	-4.1	Current Machine Av.		32.6	33.1	+0.5

TABLE XIII--Continued
INSTITUTE AND MILL CONCORDA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR NOVEMBER, 1959

Machine L				Machine M				Machine N			
Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a
L-1 2374	9-30-59	33.6	+3.4	M-1 --	10-29-59	38.6	-1.0	N-1 --	10-28-59	35.9	-2.4
L-2 214	10-4-59	33.7	+0.4								
L-3 755	10-10-59	33.6	+3.9								
L-4 1041	10-14-59	38.3	+1.3								
L-5 1399	10-18-59	33.0	+3.7								
L-6 1712	10-22-59	32.2	+5.1								
Current Machine Av.		34.1	+2.9	Current Machine Av.		38.6	-1.0	Current Machine Av.		35.9	-2.4
Machine O				Machine P				Machine Q			
Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a
O-1 187	10-20-59	33.5	-1.5	P-1 193	10-28-59	33.0	+5.5	Q-1 201	11-5-59	35.6	+0.5
O-2 188	10-20-59	33.8	+1.3	P-2 194	10-29-59	33.0	+3.7	Q-2 202	11-5-59	36.1	+3.0
O-3 193	10-20-59	32.0	+2.9	P-3 205	11-12-59	35.5	+2.8				
O-4 194	10-20-59	33.5	+3.0	P-4 206	11-12-59	36.4	+3.3				
O-5 205	11-13-59	36.5	+7.7								
O-6 206	11-13-59	35.2	+4.6								
Current Machine Av.		34.1	+3.0	Current Machine Av.		34.5	+3.8	Current Machine Av.		34.7	+1.7
Machine R				Machine S				Machine T			
Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a	Mill Roll No.	Date Made	Concorda Flat Crush, P.S.I.	Difference a
R-1 41	9-24-59	35.8	+0.2	S-1 203	11-5-59	37.6	-1.8				
R-2 42	10-9-59	35.9	+1.8	S-2 204	11-5-59	33.0	+4.3				
R-3 43	10-15-59	37.6	-2.6								
R-4 44	10-21-59	33.5	+0.2								
Current Machine Av.		35.7	-0.1	Current Machine Av.		35.3	+1.3				

The data shown in Table XXII are summarized in Part I of Table XXIII where for each machine the following information is given: (1) Current machine average based on Institute data, (2) current machine average based on mill data, (3) the average difference--that is, the difference between the current machine average based on Institute data and that based on mill data and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXIII the average difference of Part I has been converted to per cent by dividing it by the Institute average and multiplying the result by 100. The average differences in per cent for the current report and the two preceding reports are shown. It may be seen that the highest average difference of 11.0% was associated with Machine P for the current period and the lowest of 0.3% with Machine R. Differences greater than five per cent were noted for Machines D, I, J, L, N, O, and P. Only the difference for Machine P was greater than ten per cent. In the majority of comparisons, agreement between Institute and mill data was good.

TABLE XXIII
PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA
AND THOSE BASED ON MILL DATA

Machine Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Number of Rolls Compared	0	0	4	8	7	12	10	6	7	3	1	6	1	1	6	4	2	4	2
Concora Flat Crush, p.s.i.																			
Current Machine Av. (Institute) ^a			35.3	35.1	39.2	35.5	39.4	34.4	38.8	44.1	32.6	34.1	38.6	35.9	34.1	34.5	34.7	35.7	35.3
Current Machine Av. (Mill) ^a			34.6	38.6	37.7	36.0	38.5	35.3	41.5	40.0	33.1	37.0	37.6	33.5	37.1	38.3	36.4	35.6	36.6
Average Difference ^b			-0.7	+3.5	-1.5	+0.5	-0.9	+0.9	+2.7	-4.1	+0.5	+2.9	-1.0	-2.4	+3.0	+3.8	+1.7	-0.1	+1.3
Maximum difference ^c			-2.9	+7.0	-6.8	+4.4	-3.6	+2.7	+5.4	-6.5	+0.5	+5.1	-1.0	-2.4	+7.7	+5.5	+3.0	-2.6	+4.3

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH AVERAGE
BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average Difference, % ^d	--	--	-2.0	+10.0	-3.8	+1.4	-2.3	+2.6	+7.0	-9.3	+1.5	+8.5	-2.6	-6.7	+8.8	+11.0	+4.9	-0.3	+3.7
Current Report (November)	--	--	-4.1	+5.4	-4.6	-3.9	-1.8	+1.4	+3.0	-9.9	-1.8	+5.3	+3.4	-3.2	--	+10.8	+4.6	+5.4	--
53rd Report (October)	--	--	-4.8	+1.4	-3.1	-5.0	+5.0	-3.6	+2.7	-14.8	-8.8	-1.9	-10.9	-11.5	+3.0	+12.5	+5.0	--	--
51st Report (September)	--	--																	

^a Comparisons based on current machine average include only those rolls for which mill data were submitted.

^b Average difference is the difference between the current machine average based on I.P.C. test results and that based on mill test results with the I.P.C. test results used as the reference. See Table XXII.

^c Maximum difference is the greatest difference encountered in comparing I.P.C. and mill test averages for individual rolls. See Table XXII.

^d Average difference (per cent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the I.P.C. current machine average and multiplying the result by 100.

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